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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

#15/ad 4/11/94

In Re Application of: J. Bratten

U.S. Serial No. : 07/813,161

Filed On : December 24, 1991

For : BELT FILTER

Examiner : R. Popovics

Art Unit : 1308

APPELLANT'S BRIEF

Hon. Commissioner of Patents
and Trademarks
Washington, D.C. 20231

95-0086

Sir:

STATUS OF THE CLAIMS

Claims 1-11 are pending, all claims standing as rejected and are here appealed.

STATUS OF AMENDMENTS

An Amendment Under Rule 116 is filed concurrently herewith, which should obviate the indefiniteness rejection of Claim 1 under 35 USC 112, and the objection to the disclosure. Entry is assumed to be proper under Rule 116.

SUMMARY OF THE INVENTION

The invention concerns liquid filters, in which a liquid to be filtered is introduced into a tank 12. A permanent filter media belt loop 48 extends over a perforate plate 22 located over a collection chamber 20, and filtration occurs by liquid passing through the media belt 48 and into the chamber 20 with the belt 48 periodically indexed to bring a fresh segment over the perforate

plate 22 (P 4, lines 17-31, P. 5, lines 3-11).

The permanent media belt loop 48 is described as entering the tank 12 by descending down the rear wall 16, along the bottom 18 of the tank, around the far end of the tank 12, (P. 5, lines 20-23, 36, P. 6, lines 1-7, 21-25). A scraper 56 and washer pipe 62 clean the belt loop 48 as it passes beneath the bottom of the tank 12 (P. 6, lines 7-16).

The permanent filter media belt loop 48 is described as constructed of woven fabric of suitable tightness for the particular filtering application (P. 5, lines 24-28).

A pair of endless conveyor chain loops 40A, 40B are guided for circulation along the tank bottom 18 lying atop the permanent media belt loop 48 but return across the upper region of the tank interior 24 (P. 5, lines 13-19) and are periodically advanced by an indexing drive 30 (P. 5, lines 3-11).

The endless conveyor chain loops 40A, 40B normally lie atop respective side edges of the permanent media belt loop 48 as they ascend the sloping tank bottom 18 to frictionally engage the same and advance the belt loop 48 when the chain conveyor loops 40A, 40B are driven by an indexing drive assembly 30 (P. 6, lines 26-30).

The divergent routing of the chain loops 40A, 40B when leaving the tank 12 and reconverging when entering allows a disposable media belt 52 to optionally be inserted in the convergent space, the chain loops 40A, 40B then frictionally engaging the disposable media which in turn engages a portion of the permanent media belt loop 48 to allow both to be driven together.

The disposable media 52 is merely collected as it passes out

of the tank (P. 6, lines 35, 36, P. 7, lines 1-13).

ISSUES

1. Does the combined teachings of Bratten, Estabrook (U.S. 4,062,780) and Anderson (U.S. 3,741,389) suggest the apparatus recited in claims 1-3, 8, 9 under 35 USC 103?

2. Does the combined teachings of Bratten, Estabrook, Anderson, and Ishagahi ('411) suggest the apparatus suggested in claims 4-7 under 35 USC 103?

3. Does the combined teachings of Bratten, Estabrook, Anderson, and Lee suggest the structure recited in claims 10 and 11 under 35 USC 103?

GROUPING OF CLAIMS

The claims are grouped as stated in the above listing of the issues.

ARGUMENT

ISSUE 1, Claims 1-3, 8, 9

The rejections are respectfully urged to be reconstructions of the prior art which are not fairly suggested by a consideration of their collective teachings.

Bratten, U.S. patent 4,774,010 shows a basic tank type liquid filter in which disposable media 22 is driven through the tank 16 by frictional engagement with a drag conveyor 28 consisting of chain loops 48A, 48B connected by flights 50, the chain loops returning across the upper region of the tank 16.

Estabrook 4,062,780 shows carrying a disposable media through a tank on a conveyor belt 25 described as being a Cambridge belt of

grid construction, the conveyor belt 25 returning within the tank across the bottom.

Anderson, U.S. patent 3,741,389 shows a conveyor belt 16 for supporting a disposable media 13 as it passes over a tank, the belt 16 acting as a support screen as well as a conveyor for the media 13.

The Examiner argues that it would be obvious to add the Cambridge belt of Estabrook to Bratten in order to provide better support. However, it would be totally redundant to add another conveyor belt to Bratten, as the filter media conveyor function is accomplished by the overhead conveyor 28 in Bratten. There is no need for better support or movement of the filter media. The filter media is already supported on the tank bottom. A second conveyor could only degrade the support.

Furthermore, the edges of the filter media are described as being sealed by the chain conveyor loops 48A, 48B against the tank bottom. It is not clear how the edges could be sealed if the disposable media was overlain by a screen or grid belt.

The Examiner argues that this would also better move the media belt. However, in Estabrook, the belt conveyor 25 is powered by its own drive mechanism 43. There would thus be a need to carefully synchronize the chain conveyor and the proposed added Cambridge belt conveyor or else slight differences in velocity would create slippage.

Claim 1 recites that the permanent media filter belt is "freely movable along said recirculation path". Hence, it would also be necessary to add the belt of Estabrook, and delete the

drive mechanism--neither change suggested by the references in order to meet the claim language.

The Examiner contends that such a coarse grid conveyor belt could be replaced by a woven fabric belt, as recited in claim 1, as "an obvious matter of choice in design".

There is no suggestion in the references that such a powered support screen conveyor could be constructed of a woven fabric. Such conveyors should have a certain degree of stiffness, as the weight of the filter media (and the accumulated solids) must be sustained by the stiffness of the conveyor.

In Anderson, the screen conveyor 16 suspended like a catenary acts as the perforated support plate as well as the media drive.

The claimed arrangement is a novel arrangement which is not fairly suggested, i.e., a freely movable permanent media belt which is only frictionally driven by overhead chain loops, the belt driven across the bottom of the tank with its edges sealed against the tank bottom by the chain loops, and the belt recirculated beneath the bottom of the tank.

This creates a convergency allowing optional introduction of disposable media, keeping the top of the tank open and allowing belt cleaning and inspection at a location beneath the tank bottom.

Bratten, Estabrook, and Anderson describe quite different filter arrangements, which are each uniquely configured to carry out the functional features of those respective designs.

These features do not exist apart from the rest of the apparatus.

It is respectfully submitted that the features of neither

Estabrook or Anderson would be deemed applicable to Bratten, as Estabrook and Anderson both concern a powered carrying conveyor disposed beneath the filter media and Bratten concerns an overhead friction driving conveyor.

ISSUE 2, Claims 4-7

The Examiner argues it would be obvious to further add the scraper-washer of Ishigahi to the modified apparatus produced by the combination of Bratten, Estabrook and Anderson.

However, the conveyor 25 of Estabrook does not perform a filtering function, this is done on the disposable media layer. Thus, there would be no need to scrape or wash the Cambridge belt by locating a scraper and/or washer unit below the tank bottom.

ISSUE 3, Claims 10, 11

The Examiner argues that it would be obvious to add the edge sealing of Lee to the combined apparatus of Bratten, Estabrook, and Anderson. Again, the conveyor 25 of Estabrook is not sealed to any surface, and adding an edge sealing would not be suggested.

Accordingly, reversal of the Examiner's rejection of claims 1-11 is deemed to be proper.

Respectfully submitted,

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CERTIFICATE OF MAILING UNDER 37 CFR 1.8 (a)

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By: Dannette Lehman

APPENDIX

1. A filter apparatus for filtering solids from a liquid comprising:

a tank constructed and arranged to receive liquid to be filtered, said tank including a bottom and a rear endwall;

a perforate section formed in said tank bottom, a collection chamber disposed beneath said perforate section, and means for drawing liquid through said perforate section into said collection chamber;

a continuous loop of a woven fabric porous permanent filter media belt, including a segment extending down said rear wall and passing along said tank bottom over said perforate section to an exit point at the end of said tank opposite said rear wall;

guide means guiding said continuous loop permanent filter media belt out of said tank at a side opposite said rear wall, beneath said tank bottom, up the outside of said rear wall and back into said tank to extend in an endless recirculated path;

said continuous loop permanent filter media belt freely movable along said recirculation path;

a pair of continuous chain conveyor loops disposed within said tank, each of said chain conveyor loops including a segment extending over a respective side edge of said filter media belt along said bottom of said tank to said exit;

guide means directing said chain conveyor loops from said exit point back over the upper region of said tank to said rear wall and back into said tank, converging with said permanent filter media

belt at said rear wall, said permanent media belt and said chain conveyor loops thereby taking divergent routes after exiting said tank;

index drive means for periodically advancing said chain conveyor loops incrementally from said rear wall;

said chain conveyor loops drivingly engaging segments of said permanent filter media belt by frictional contact to advance said segments with said chain conveyor segments during indexing thereof causing said permanent filter media belt to move along said endless recirculation path.

2. The filter apparatus according to claim 1 wherein said chain conveyor loop segments each lie directly atop one side of said permanent filter media belt segment to establish direct frictional engagement therewith.

3. A filter apparatus for filtering solids from a liquid comprising:

a tank constructed and arranged to receive liquid to be filtered, said tank including a bottom and a rear endwall;

a perforate section formed in said tank bottom, a collection chamber disposed beneath said perforate section, and means for drawing liquid through said perforate section into said collection chamber;

a continuous loops of a woven fabric porous permanent filter media belt, including a segment extending down said rear wall and passing along said tank bottom over said perforate section to an exit point at the end of said tank opposite said rear wall;

guide means guiding said continuous loop permanent filter

media belt out of said tank at a side opposite said rear wall, beneath said tank bottom, up the outside of said rear and back into said tank to extend in an endless recirculation path;

said continuous loop permanent filter media belt freely movable along said recirculation path;

a pair of continuous chain conveyor loops disposed within said tank, each of said chain conveyor loops including a segment extending over a respective side edge of said filter media belt along said bottom of said tank to said exit;

guide means directing said chain conveyor loops from said exit point back over the upper region of said tank to said rear wall and back into said tank, converging with said permanent filter media belt at said rear wall, said permanent media belt and said chain conveyor loops thereby taking divergent routes after exiting said tank;

index drive means for periodically advancing said chain conveyor loops incrementally from said rear wall;

said chain conveyor loops drivingly engaging segments of said permanent filter media belt segments by frictional contact to advance said segments with said chain conveyor segments during indexing thereof causing said permanent filter media belt to move along said endless recirculation path;

a disposable porous media belt entering between said chain conveyor loops and said permanent filter media belt as said chain conveyor loops and said permanent filter media belt converge together at said rear wall, said disposable media belt extending along said tank bottom and out said exit end of said tank, said

chain conveyor loop segment lying atop side edges of said disposable media belt to indirectly frictionally engage said side edges of said permanent filter media belt segments to cause incremental advance of each.

4. The filter apparatus according to claim 1 wherein said belt guide means causes downward rearward routing of said permanent filter media belt and further including a scraper edge inclined to scrape the lower surface of said permanent filter media belt as said belt proceeds rearwardly beneath said tank.

5. The filter apparatus according to claim 4 further including a trough beneath said tank, said belt guide means causing said permanent filter media belt to be looped within said trough, and was jet means directly washing jets from the upper surface of said belt in said collection trough.

6. The filter apparatus according to claim 5 wherein said scraper edge slants down and away from the lower surface of said permanent filter media belt.

7. The filter apparatus according to claim 6 wherein said scraper edge is affixed to said collection trough.

8. The filter apparatus according to claim 1 wherein said tank bottom slopes upwardly from the bottom of said tank rear wall.

9. The filter apparatus according to claim 1 wherein said chain conveyor loops are connected together by a series of spaced apart chain flights extending across said tank from loop to loop.

10. The filter apparatus according to claim 1 wherein said side edges of said permanent filter media belt are coated.

11. The filter apparatus according to claim 10 are coated

with urethane plastic impregnated into the porous material of said side edges.